

	Millions of years.
Laurentian, Cambrian, and Silurian	200
Old Red, Carboniferous, Permian, and New Red	200
Jurassic, Wealden, Cretaceous, Eocene, Miocene, Pliocene, and Post-pliocene	200
	600

The concluding part of the paper consists of answers to objections. The author contends that the facts adduced prove geological time to be enormously in excess of the limits urged by some physicists, and ample to allow on the hypothesis of evolution for all the changes which have taken place in the organic world.

VI. "Preliminary Note on the Substances which produce the Chromospheric Lines." By J. NORMAN LOCKYER, F.R.S.
Received December 24, 1878.

Hitherto, when observations have been made of the lines visible in the sun's chromosphere, by means of the method introduced by Janssen and myself in 1868, the idea has been that we witness in solar storms the ejection of vapours of metallic elements with which we are familiar from the photosphere.

A preliminary discussion of the vast store of observations recorded by the Italian astronomers (chief among them Professor Tacchini), Professor Young, and myself, has shown me that this view is in all probability unsound. The lines observed are in almost all cases what I have elsewhere termed and described as *basic lines*; of these I only need for the present refer to the following:—

- b_3 ascribed by Ångström and Kirchhoff to iron and nickel.
 b_4 „ Ångström to magnesium and iron.
 5268 by Ångström to cobalt and iron.
 5269 „ „ calcium and iron.
 5235 „ „ cobalt and iron.
 5017 „ „ nickel.
 4215 „ „ calcium, but to strontium by myself.
 5416 an unnamed line.

Hence, following out the reasoning employed in my previous paper, the bright lines in the solar chromosphere are chiefly lines due to the not yet isolated bases of the so-called elements, and the solar phenomena in their totality are in all probability due to dissociation at the photospheric level, and association at higher levels. In

x 2

this way the vertical currents in the solar atmosphere, both ascending and descending, intense absorption in sun-spots, their association with the faculæ, and the apparently continuous spectrum of the corona and its structure, find an easy solution.

We are yet as far as ever from a demonstration of the cause of the variation in the temperature of the sun; but the excess of so-called calcium with minimum sun-spots, and excess of so-called hydrogen with maximum sun-spots follow naturally from the hypothesis, and afford indications that the temperature of the hottest region in the sun closely approximates to that of the reversing layer in stars of the type of Sirius and α Lyrae.

If it be conceded that the existence of these lines in the chromosphere indicates the existence of basic molecules in the sun, it follows that as these lines are also seen generally in the spectra of two different metals in the electric arc, we must be dealing with the bases in the arc also.

January 30, 1879.

W. SPOTTISWOODE, M.A., D.C.L., President, in the Chair.

The Presents received were laid on the table and thanks ordered for them.

The following Papers were read:—

I. "On the Effect of Heat on the Di-iodide of Mercury, HgI_2 ."

By G. F. RODWELL, Science Master, and H. M. ELDER, a Pupil, in Marlborough College. Communicated by Professor TYNDALL, F.R.S., Professor of Natural Philosophy in the Royal Institution. Received January 9, 1879.

In continuation of the experiments on the effects of heat on the chloride, bromide, and iodide of silver, which one of us has previously had the honour of communicating to the Society,* it was thought to be advisable to search in some of the other metallic iodides for molecular anomalies similar to those presented by the iodide of silver. Among these no substance appeared more likely to possess such anomalies than the di-iodide of mercury. This substance, as is well known, is dimorphous. In the amorphous condition it presents the appearance of a brilliant scarlet powder, which, if heated, fuses at 200°C ., and volatilises just above the fusing point to a vapour more

* "Proc. Roy. Soc.," vol. xxv, p. 280.